

AMENDMENTS TO THE SPECIFICATION:

Please replace the corresponding paragraphs of the specification with the following amended paragraphs:

[0006] In the method, the processing space, with a smooth lateral area A_m (housing surface), a free volume V_f as well as the outer diameter of the screw D_a and the internal diameter of the screw D_i of the screws rotating only with respect to their own axis in the same ~~sense~~ direction and also having a smooth surface, is designed in such a manner that at least one part of the processing area has a ratio A_m^3/V_f^2 between 1020 and 3050 for twin screw elements and a ratio A_m^3/V_f^2 between 2000 and 7300 for triple screw elements at a D_a/D_i ratio of 1.3 to 1.7. In this context, the free volume V_f refers to the receiving capacity of the components that are supplied. Each volume unit of the product is provided with a large surface for cooling/heating and degassing the product, which permits smooth handling of the ~~educts~~ components that are supplied and, therefore, high quality of the final product. The smooth lateral area of the extruder processing space and the smooth surface of the self-cleaning screws ensure that the extruder is fully self-cleaning.

[0007] Smooth processing of the ~~educts~~ components is achieved by means of a plurality of screws with the smallest possible screw diameter, coupled with low speeds of rotation of up to 600 rpm. The resulting shearing and kneading forces hardly impair the product. The plurality of screws results in a short length of the process step with a high ratio between the surface and the free volume.

[00010] It is advisable to apply to the extruder a torque density (torque per screw/axis distance³) of at least 7 Nm/cm³ and, in particular, at least 9 Nm/cm³. A higher torque density permits a higher performance input at the same speed of

rotation, therefore leads to [in] an increased throughput and, as a result thereof, a shorter residence time, as a result of which the heating of the ~~educts~~ components that are supplied decreases throughout the process; therefore, a lower thermal damage of the products can be achieved.

[00014] The educt component to be processed is a contaminated and/or humid polycondensate, in particular a polyester, such as a polyester recyclate. The polyester recyclate can, for example, be a PET bottle recyclate. The disclosed method can be particularly suited herefor since the large specific surface favors drying and degassing of the product, as a result of which undesired volatile components of the polycondensate are removed to a large extent. In this respect, the removal of water molecules from the polycondensate which lead to hydrolysis of the chain molecules and therefore the decrease in the intrinsic viscosity of the polycondensate is of particular importance. The large specific surface and, as a result thereof, improved cooling of the product and the improved degassing of any oxidative contamination also reduces the purely thermal as well as thermooxidative reduction of the chain molecules. Overall, this leads to a less damaging treatment and, consequently, a high quality of the product, in addition to making the method very economical.

Brief Description of the Drawings.

Fig. 1 is a schematic of a multi-shaft extruder according to an exemplary embodiment of the invention; and

Fig. 2 is a cross-section of a multi-shaft extruder according to an exemplary embodiment of the invention.

Detailed Description

[00015] In the method, the processing space of the extruder 1, with a smooth wedge surface (7) Az, a free volume (8) Vf as well as the outer diameter (5) Da and the internal diameter 6 Di of the screws 3 rotating only with respect to their own axis in the same sense and also having a smooth surface, is designed in such a manner that at least one part of the processing area has a ratio Az^3/Vf^2 between 0.5 and 2.11 for twin screw elements and a ratio Az^3/Vf^2 between 0.02 and 1.50 for triple screw elements at a Da/Di ratio of 1.3 to 1.7. The high percentage of wedge areas leads to a high number of rearrangement processes and therefore good mixing properties. In particular in case several wedge areas are used, increased axial flow of the material is achieved, which contributes to reducing the residence time of the product in the extruder. Once again, the product is processed in a less impairing manner by using a plurality of screws with the lowest possible screw diameter in combination of low speeds of rotation of up to 600 rpm. The resulting shearing and kneading forces hardly impair the product. The plurality of screws results in a short length of the processing step with a high ratio between the specific wedge surface and the free volume. Once again, the smooth wedge area and the smooth surface of the self-cleaning screws ensure complete self-cleaning of the processing space.

[00026] Another improvement in terms of cooling is achieved by using an extruder with a temperature-controllable core 10 and a temperature-controllable housing 11 which are both stationary; depending on the requirements, the temperature of the core 10 and the housing 11 can also be controlled separately. For that purpose, it is advisable to divide the housing 11 into segments whose temperatures can be controlled separately.

[00033] Processing of the molten polycondensate outside of the extruder can contain a step of filtering the melt to remove contaminating particles. To create the necessary pressure, a melt pump 12 can, for example, be used. For that purpose, the melt pump and the melt filter can be integrated in the process in such a manner that the short residence time is maintained.